REVISIONS			
LTR	DESCRIPTION	DATE (YR-MO-DA)	APPROVED
A	Change to military drawing format. Change CAGE code to 67268. Add 01DX and 01HX. Table I, change unit for I_{IO} and I_{IB} to mA. Editorial changes throughout.	1988 JUL 22	M. A. Frye
B	Table I; add aditional saturation voltage test. 6.4; add replacement military specification part number. Editorial changes throughout. Table I, input voltage range; change test conditions from V+ = 5 mV to V+ = 5 V.	1988 DEC 22	M. A. Frye
C	Add test limits at temperature for I_{CC}+ AND I_{CC}-. Add vendor CAGE 06665. Add case outline 2. Editorial changes throughout.	1990 JAN 24	M. A. Frye

CURRENT CAGE CODE 67268

REV																			
SHEET																			
REV																			
SHEET																			

REV STATUS OF SHEETS	**REV**	**C**	**C**	**C**	**C**	**C**	**C**	**C**	**C**						
	SHEET	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**						

PMIC N/A

STANDARDIZED MILITARY DRAWING

THIS DRAWING IS AVAILABLE FOR USE BY ALL DEPARTMENTS AND AGENCIES OF THE DEPARTMENT OF DEFENSE

AMSC N/A

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DRAWING APPROVAL DATE
6 FEBRUARY 1986

REVISION LEVEL
C

DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OHIO 45444

MICROCIRCUIT, LINEAR, DUAL, HIGH SPEED, VOLTAGE, COMPARATOR, MONOLITHIC SILICON

SIZE	CAGE CODE	
A	**14933**	**86014**

SHEET 1 OF 8

DESC FORM 193-1
SEP 87

*** US GOVERNMENT PRINTING OFFICE: 1987--748-129/60912**
5962-E1565

1. SCOPE

1.1 Scope. This drawing describes device requirements for class B microcircuits in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices".

1.2 Part number. The complete part number shall be as shown in the following example:

86020	01	C	X
Drawing number	Device type (1.2.1)	Case outline (1.2.2)	Lead finish per MIL-M-38510

1.2.1 Device type. The device type shall identify the circuit function as follows:

Device type	Generic number	Circuit function
01	LM119	High speed, dual, voltage comparator
02	LM119A	High speed, dual, voltage comparator

1.2.2 Case outlines. The case outlines shall be as designated in appendix C of MIL-M-38510, and as follows:

Outline letter	Case outline
C	D-1 (14-lead, .785" x .310" x .200"), dual in-line package
D	F-2 (14-lead, .390" x .260" x .085"), flat package
H	F-4 (10-lead, .290" x .260" x .085"), flat package
I	A-2 (10-lead, .370" x .185"), can package
2	C-2 (20-terminal, .358" x .358" x .100"), square chip carrier package

1.3 Absolute maximum ratings.

Total supply voltage	36 V dc
Output to negative supply voltage	36 V dc
Ground to negative supply voltage	25 V dc
Ground to positive supply voltage	18 V dc
Differential input voltage	±5 V dc
Input voltage	±15 V dc 1/
Power dissipation (P_D)	500 mW
Output short circuit duration	10 seconds
Storage temperature range	-65°C to +150°C
Lead temperature (soldering, 10 seconds)	+300°C
Junction temperature (T_J)	+175°C
Thermal resistance, junction-to-case (θ_{JC})	See MIL-M-38510, appendix C
Thermal resistance, junction-to-ambient (θ_{JA}):	
Case C	100°C/W
Cases D and I	150°C/W
Case H	158°C/W
Case 2	110°C/W

1.4 Recommended operating conditions.

Ambient operating temperature range (T_A)	-55°C to +125°C

1/ For supply voltages less than ±15 V, the absolute maximum input voltage is equal to the supply voltage.

2. APPLICABLE DOCUMENTS

2.1 Government specification, standard, and bulletin. Unless otherwise specified, the following specification, standard, and bulletin of the issue listed in that issue of the Department of Defense Index of Specifications and Standards specified in the solicitation, form a part of this drawing to the extent specified herein.

SPECIFICATION

MILITARY

MIL-M-38510 - Microcircuits, General Specification for.

STANDARD

MILITARY

MIL-STD-883 - Test Methods and Procedures for Microelectronics.

BULLETIN

MILITARY

MIL-BUL-103 - List of Standardized Military Drawing (SMD's).

(Copies of the specification, standard, and bulletin required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Order of precedence. In the event of a conflict between the text of this drawing and the references cited herein, the text of this drawing shall take precedence.

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be in accordance with 1.2.1 of MIL-STD-883, "Provisions for the use of MIL-STD-883 in conjunction with compliant non-JAN devices" and as specified herein.

3.2 Design, construction, and physical dimensions. The design, construction, and physical dimensions shall be as specified in MIL-M-38510 and herein.

3.2.1 Terminal connections. The terminal connections shall be as specified on figure 1.

3.2.2 Case outlines. The case outlines shall be in accordance with 1.2.2 herein.

3.3 Electrical performance characteristics. Unless otherwise specified herein, the electrical performance characteristics are as specified in table I and shall apply over the full ambient operating temperature range.

3.4 Electrical test requirements. The electrical test requirements shall be the subgroups specified in table II. The electrical tests for each subgroup are described in table I.

3.5 Marking. Marking shall be in accordance with MIL-STD-883 (see 3.1 herein). The part shall be marked with the part number listed in 1.2 herein. In addition, the manufacturer's part number may also be marked as listed in MIL-BUL-103 (see 6.6 herein).

TABLE I. Electrical performance characteristics.

Test	Symbol	Conditions $-55°C \le T_A \le +125°C$ $V_S = \pm 15$ V unless otherwise specified	Device type	Group A subgroups	Limits		Unit
					Min	Max	
Input offset voltage	V_{IO}	$R_S = 5\ k\Omega$	01	1		4	mV
				2, 3		7	
			02	1		1	
				2, 3		2	
Input offset current	I_{IO}		01	1		75	nA
				2, 3		100	
			02	1		40	
				2, 3		75	
Input bias current	I_{IB}		All	1		500	nA
				2, 3		1000	
Voltage gain	A_V	$T_A = +25°C$	01	4	10		V/mV
			02		20		
Saturation voltage	V_{SAT}	$T_A = +25°C$, $V_{IN} \le -5$ mV, $I_{OUT} = 25$ mA	All	1		1.5	V
		V+ $\ge$ 4.5 V, V- = O V, $V_{IN} \le -6$ mV, $I_{SINK} \le 3.2$ mA		1,2		0.4	
				3		0.6	
Output leakage current	I_O	$V_{IN} \ge 5$ mV, $V_{OUT} = 35$ V	All	1		2	µA
				2, 3		10	
Input voltage range	V_I	V+ = 5 V, V- = 0 V	All	1,2,3	1	3	V
					-12	+12	
Supply current	I_{CC+}	V+ = 15 V	All	1		11.5	mA
				2, 3		12.5	
	I_{CC-}	V- = -15 V		1		-4.5	
				2, 3		-6.0	
Common mode rejection ratio	CMRR	$T_A = +25°C$	All	4	80		dB

Device types	01		02		
Case outlines	C, D	H, I	2	C	I
Terminal number	Terminal symbol				
1	NC	OUT1	NC	NC	OUT1
2	NC	GND1	NC	NC	GND1
3	GND1	+IN1	NC	GND1	+IN1
4	+IN1	-IN1	GND1	+IN1	-IN1
5	-IN1	V-	NC	-IN1	V-
6	V-	OUT2	+IN1	V-	OUT2
7	OUT2	GND2	NC	OUT2	GND2
8	GND2	+IN2	-IN1	GND2	+IN2
9	+IN2	-IN2	V-	+IN2	-IN2
10	-IN2	V+	OUT2	-IN2	V+
11	V+		NC	V+	
12	OUT1		GND2	OUT1	
13	NC		+IN1	NC	
14	NC		-IN2	NC	
15			NC		
16			V+		
17			NC		
18			OUT1		
19			NC		
20			NC		

FIGURE 1. Terminal connections.

3.6 Certificate of compliance. A certificate of compliance shall be required from a manufacturer in order to be listed as an approved source of supply in MIL-BUL-103 (see 6.6 herein). The certificate of compliance submitted to DESC-ECC prior to listing as an approved source of supply shall affirm that the manufacturer's product meets the requirements of MIL-STD-883 (see 3.1 herein) and the requirements herein.

3.7 Certificate of conformance. A certificate of conformance as required in MIL-STD-883 (see 3.1 herein) shall be provided with each lot of microcircuits delivered to this drawing.

3.8 Notification of change. Notification of change to DESC-ECC shall be required in accordance with MIL-STD-883 (see 3.1 herein).

3.9 Verification and review. DESC, DESC's agent, and the acquiring activity retain the option to review the manufacturer's facility and applicable required documentation. Offshore documentation shall be made available onshore at the option of the reviewer.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling and inspection. Sampling and inspection procedures shall be in accordance with section 4 of MIL-M-38510 to the extent specified in MIL-STD-883 (see 3.1 herein).

4.2 Screening. Screening shall be in accordance with method 5004 of MIL-STD-883, and shall be conducted on all devices prior to quality conformance inspection. The following additional criteria shall apply:

a. Burn-in test, method 1015 of MIL-STD-883.

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) T_A = +125°C, minimum.

b. Interim and final electrical test parameters shall be as specified in table II herein, except interim electrical parameter tests prior to burn-in are optional at the discretion of the manufacturer.

4.3 Quality conformance inspection. Quality conformance inspection shall be in accordance with method 5005 of MIL-STD-883 including groups A, B, C, and D inspections. The following additional criteria shall apply.

4.3.1 Group A inspection.

a. Tests shall be as specified in table II herein.

b. Subgroups 5, 6, 7, 8, 9, 10, and 11 in table I, method 5005 of MIL-STD-883 shall be omitted.

4.3.2 Groups C and D inspections.

a. End-point electrical parameters shall be as specified in table II herein.

b. Steady-state life test conditions, method 1005 of MIL-STD-883:

(1) Test condition A, B, C, or D using the circuit submitted with the certificate of compliance (see 3.6 herein).

(2) T_A = +125°C, minimum.

(3) Test duration: 1,000 hours, except as permitted by method 1005 of MIL-STD-883.

TABLE II. Electrical test requirements.

MIL-STD-883 test requirements	Subgroups (per method 5005, table I)
Interim electrical parameters (method 5004)	---
Final electrical test parameters (method 5004)	1*, 2, 3, 4
Group A test requirements (method 5005)	1, 2, 3, 4
Groups C and D end-point electrical parameters (method 5005)	1

*PDA applies to subgroup 1.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-M-38510.

6. NOTES

6.1 Intended use. Microcircuits conforming to this drawing are intended for use when military specifications do not exist and qualified military devices that will perform the required function are not available for OEM application. When a military specification exists and the product covered by this drawing has been qualified for listing on QPL-38510, the device specified herein will be inactivated and will not be used for new design. The QPL-38510 product shall be the preferred item for all applications.

6.2 Replaceability. Replaceability is determined as follows:

a. Microcircuits covered by this drawing will replace the same generic device covered by a contractor-prepared specification or drawing.

b. When a QPL source is established, the part numbered device specified in this drawing will be replaced by the microcircuit identified as part number M38510/1030*B*X.

6.3 Configuration control of SMD's. All proposed changes to existing SMD's will be coordinated with the users of record for the individual documents. This coordination will be accomplished in accordance with MIL-STD-481 using DD Form 1693, Engineering Change Proposal (Short Form).

6.4 Record of users. Military and industrial users shall inform Defense Electronics Supply Center when a system application requires configuration control and the applicable SMD. DESC will maintain a record of users and this list will be used for coordination and distribution of changes to the drawings. Users of drawings covering microelectronics devices (FSC 5962) should contact DESC-ECS, telephone (513) 296-6022.

6.5 Comments. Comments on this drawing should be directed to DESC-ECS, Dayton, Ohio 45444, or telephone (513) 296-6010.

6.6 Approved sources of supply. Approved sources of supply are listed in MIL-BUL-103. Additional sources will be added to MIL-BUL-103 as they become available. The vendors listed in MIL-BUL-103 have agreed to this drawing and a certificate of compliance (see 3.6 herein) has been submitted to and accepted by DESC-ECS. The approved sources listed below are for information purposes only and are current only to the date of the last action of this document.

Military drawing part number	Vendor CAGE number	Vendor similar part number 1/	Replacement military specification part number
8601401CX	64155 27014 06665	LM119J/883 LM119J/883 PM119Y/883	M38510/10306BCX
8601401DX	2/	LM119/BDA	---
8601401HX	64155 27014	LM119W/883 LM119W/883	---
8601401IX	64155 27014	LM119H/883 LM119H/883	M38510/10306BIX
86014012X	06665	PM119RC/883	---
8601402CX	64155	LT119AJ/883	M38510/10307BCX
8601402IX	64155	LT119AH/883	M38510/10307BIX

1/ Caution. Do not use this number for item acquisition. Items acquired to this number may not satisfy the performance requirements of this drawing.
2/ Unavailable from an approved source.

Vendor CAGE number	Vendor name and address
06665	Precision Monolithics, Incorporated 1500 Space Park Drive P.O. Box 58020 Santa Clara, CA 95052-8020
27014	National Semiconductor Corporation 2900 Semiconductor Drive Santa Clara, CA 95051
64155	Linear Technology Corporation 1630 McCarthy Boulevard Milpitas, CA 95035-7487